OR-4. MODIFYING THE SURFACE OF CERIUM OXIDE NANOPOWDERS PRODUCED BY PHYSICAL METHOD

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Cerium oxide nanoparticles present an interesting material for different industrial applications in biotechnology and medicine. The CeO_2 nanopowder was produced by the method of pulsed electron evaporation of ceramic oxide targets with condensation of the vapors in a low pressure gas [1]. The modification of nanoparticle surface was made with sodium citrate and N-phosphonomethylaminodiacetic acid [2]. The stable aqueous suspensions of CeO_2 nanoparticles could not be obtained in the work. This is probably due to the high hydrophobic properties of the nanoparticle surface.

Dimensions of agglomerates in CeO_2 nanoparticles suspension modified with sodium citrate

CeO_2/ Sodium citrate, mg/ml	The average size of the agglomerates of the suspension, nm	Comments
1/1	150 ÷ 200, 600	Evidently two distribution peaks
0,5/0,5	150 ÷ 200, 600	Two distribution peaks are clearly expressed
0,5/0,25	50 ÷ 1000	Uniform distribution of all sizes
0,5/0,5 + DMEM	200	One peak distribution

The present paper dealt with cerium oxide nanoparticles obtained by a pulsed electron beam evaporation in the low-pressure gas. The result of work was the surface modifications of CeO_2 nanoparticles with sodium citrate and PMIDA. The use of sodium citrate in ratio of 1 : 1 leads to more stable aqueous colloid. However, the sedimentation rate for this solution is rather high and nanoparticles precipitate during several days. We could not obtained stable nanodispersed colloidal solutions of CeO_2 nanoparticles with PMIDA modification as well. The high hydrophobic properties of the CeO_2 nanoparticles surface is probably responsible for this result.

References

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